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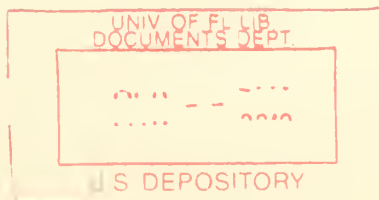
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IMPROVEMENT OF PASTURES IN EASTERN
NEW YORK AND THE NEW
ENGLAND STATES.

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IMPROVEMENT OF PASTURES IN EASTERN NEW YORK AND THE NEW ENGLAND STATES.^a

INTRODUCTION.

One of the most important problems confronting farmers in the Eastern States is the improvement of worn-out pastures. This is especially true in eastern New York and the New England States. The pastures in this region are of two general types: (1) Those that are smooth enough to permit cultivation and which, if so desired, can be included in a rotation system, and (2) those that are too rough and too rocky to permit cultivation and can only be utilized as pastures or allowed to grow up to timber. Figures have not been obtained to show the relative percentage of these two types of pastures. In eastern New York it is probable that the area of each kind is about the same. In the New England States the country is more broken, and the rough, broken pasture land that must always remain as such greatly predominates.

These pastures were cleared of timber from forty to one hundred years ago, depending somewhat on the locality in which they are situated. For the most part they were allowed to sod over by natural processes. So far as can be learned, they have been grazed continuously from early spring until late fall, practically to their full grazing capacity, ever since their establishment. During this time almost no improvement in the way of fertilizing, seeding, or

^a New England is primarily a region of live-stock farming, for the most part dairying. The problem of the old pastures of that region is closely associated with the general problem of producing feed for dairy cows on the farms of those States. In Farmers' Bulletin 337, entitled "Cropping Systems for New England Dairy Farms," it was pointed out that much of the tillable land in this region could be made more productive by the use of better cropping systems. At that time it was fully realized that the matter of pastures in this region was also of very great importance, as pastures occupy a large percentage of the area of the average dairy farm. After further investigations it has been deemed advisable to point out some of the fundamental principles in the improvement of these pastures, and this has been done in this paper, which supplements the bulletin mentioned.—A. F. Woods, *Acting Chief of Bureau*

keeping the weeds down has been attempted. As a result many of these pastures have been so badly overgrazed that at the present time they do not produce enough feed to pay for maintaining the fences, let alone the building of new ones. (See Pl. I, fig. 1.) In many cases weeds have taken complete possession, as is shown in Plate II, figure 1. In a number of instances the pastures have been entirely abandoned and are growing up to young timber.

It is stated that this depreciation has been very rapid during the last twenty years. There are two reasons for this: First, the depreciation of a pasture as the result of overgrazing will be much greater during the latter half or even quarter of the period grazed than in the preceding years. Again, with the increased demand for dairy products and with better facilities for transportation there has been a decided tendency on the part of the farmers to buy western grain and raise only the necessary roughage on their places. This has enabled them to carry much more stock. With this increase in stock there has not been any corresponding increase in the size of the pastures, nor has there been any attempt to increase their carrying capacity.

DAIRY AND BEEF PASTURES CONTRASTED.

The dairy pastures in the region referred to have depreciated very greatly, and in many instances to the extent that they have very little value. In direct contrast there are numerous beef-cattle pastures in Kentucky, Tennessee, and Virginia of the same age that are fully as productive as ever, and are valued at \$100 or more an acre, even when located 20 to 30 miles from a railroad. In the northwestern part of Middlesex County, Ontario, there is an area of nearly 300,000 acres that the farmers, owing to scarcity of labor, have rented to cattle grazers for fattening export cattle. After twenty years' use practically all of these pastures are as good as ever, and in many instances have actually improved. Care is taken that these pastures shall not be overgrazed. If such pastures show any tendency to depreciation, steps, such as feeding roughage on the high points during the winter season to add to the fertility, the application of lime and bone meal, and other means that may be considered necessary, are immediately taken to restore them. All weeds that are likely to prove dangerous are carefully kept out.

In the corn belt men buy badly worn land for \$25 an acre, and by putting it into pastures and feeding cattle on it are able to build up this land so that in from five to ten years it is worth from \$100 to \$125 an acre.

A comparison of eastern pastures with those of the corn belt is made here only for the purpose of showing that neglected land can be built up when utilized as pasture and fed upon, or, in other words,



FIG. 1.—BADLY OVERGRAZED DAIRY PASTURES FROM WHICH THE VALUABLE FORAGE PLANTS HAVE BEEN PRACTICALLY EXTERMINATED.



FIG. 2.—NATIVE BEEF PASTURES THE SAME AGE AS THOSE SHOWN IN FIGURE 1, WHICH HAVE NEVER BEEN OVERSTOCKED.

WORN-OUT AND PRODUCTIVE PASTURES.



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when fertilized, and can be made worth from four to six times as much as it was previous to the building-up process.

REASONS FOR THE DETERIORATION OF DAIRY PASTURES.

At first glance it would seem that the difference between beef pastures and the eastern New York and New England dairy pastures is due to difference of soil conditions. However, we find pastures within a short distance of the highly productive ones and on the same soil that have been almost denuded of their original vegetation and that are no more productive than the one shown in Plate I, figure 1. Again, in a few instances small protected areas have been found in the New York and New England region that are producing a large quantity of feed. In fact, one such area has been found near the pasture shown in Plate I, figure 1, but where the soil was not as deep.

The investigations that have been carried on show very plainly that while the difference in soil types and climatic conditions modifies to a greater or less extent the carrying capacity of pastures, the essential difference between the dairy pastures of this region and the beef pastures described is more largely due to the methods of management.

RESULTS OF TOO EARLY GRAZING.

The best cattle grazers have learned that if cattle are turned on pastures before the grass gets a good start, or, as they term it, "gets strong," and is 2 or 3 inches high, the cattle do not do as well and the pastures are greatly retarded. In the case of New England pastures, stock are usually turned out before the grass gets a good start, and more cattle are kept than the pastures will maintain, extra feeding in the barnyard being practiced.

A study of the life history of plants shows us that they must get a considerable number of green leaves started in order to make any substantial growth. If the green parts are kept too closely grazed the plants of necessity will grow slowly, produce very little feed, and eventually become enfeebled and die out. In spite of this fact the great majority of eastern farmers consider that it is bad for a pasture to let the grass get a start, believing that a more dense sod is obtained by close grazing. The excellent stands of grass obtained in many of the southern beef pastures where the grass is allowed to get a good start before it is grazed (Pl. II, fig. 2) show that this statement does not hold true.

RESULTS OF TOO CLOSE GRAZING.

The beef-cattle men have learned that it is very unwise for them to overstock their pastures. If an animal is to be gotten fat enough

for market purposes on grass, there must be a luxuriant growth of it. (See Pl. I, fig. 2, and Pl. II, fig. 2.) If an attempt is made to carry too large a number, the animals immediately begin to lose flesh. This means that a beef pasture can not be profitably grazed to a point where it will be damaged.

Many dairymen consider that cattle do not do as well where the grass gets tall. It is true that if grass is allowed to head out and get woody live stock do not relish it. The best stockmen have learned by experience that whenever grass gets ahead of the cattle it is an easy matter to mow the tall grass, letting it lie on the ground as a mulch. This allows the grass to again send up a fresh, succulent growth, the pasture and the cattle both being benefited. While stock do not do as well if the grass is too old, it is equally true that the grass must be given a chance to get a good start.

Many New England farmers believe that by close grazing weeds can be kept out. As a matter of fact, this very practice gives the weeds a better start. In the western part of the United States, where the rainfall is much less than in the East, the fact that overgrazing causes weeds to become more abundant has been very definitely proved. In California, as a result of overgrazing, the original grasses and forage plants were destroyed. Their places were taken by other plants that were not relished by live stock, these plants gaining ground because the stock did not eat them readily. After the more valuable forage plants disappeared, the stock learned to eat the plants of inferior character. These in turn were overgrazed and disappeared, their places being taken by plants having still less forage value. In this manner the carrying capacity of the California ranges has been greatly lowered in the course of two generations.^a

A study of range conditions shows that whenever a dry season occurs if there is not enough vegetation to make a good ground cover, as is the case with the pasture shown in Plate I, figure 1, the soil dries out very rapidly and many plants are killed. With the advent of a more favorable season the weeds usually take their places. This condition has occurred in eastern New York and the New England States during the seasons of 1908 and 1909. It will be even more strikingly shown in 1910 if the season is favorable for plant growth. The weeds naturally are followed by brush (Pl. II, fig. 1), and the pasture eventually becomes worthless. Many farmers, not knowing the remedy, take no steps to prevent this condition of affairs. They consider that their pastures have "just naturally played out" and that there is no practical remedy.

^a Bulletin 12, Bureau of Plant Industry, U. S. Dept. of Agriculture. 1902.

DETERIORATION MOSTLY DUE TO OVERGRAZING.

The deterioration of pastures carrying dairy cattle is for the most part due to too close grazing. It is a provision of nature that perennial plants store up food in their roots, which is used by them when starting a fresh growth in the early spring. If such plants are kept grazed so closely that they are unable to store up this food they eventually become enfeebled and die. In addition, there are a number of other conditions resulting from close grazing. First, close grazing carried on over a period of years results in a heavy loss of humus, which is necessary for plant growth. Also, when a pasture is grazed closely, so that there is no plant growth to form a mulch (Pl. I, fig. 1), the evaporation is very great. Under such conditions the soil becomes too dry for the maintenance of the native forage plants. As the forage plants give way, drought-resisting weeds take their places, as has happened in the pasture shown in Plate II, figure 1. Again, dairy cattle by the production of milk take more from such a pasture than they return. This results in a loss of plant food, which also becomes evident after a period of years. This loss of plant food is much less than in the case of a hay meadow from which the hay is sold year after year, but nevertheless it is going on just the same.

METHODS OF IMPROVING PASTURES.

There are numerous areas on steep sidehills, where the soil is naturally thin and poor and where there is much danger of damage through erosion, that should never have been cleared of timber. If these places have not already reverted to timber they should be reforested as soon as possible.^a

The increased price of western grain will probably require the eastern farmer to go back to the old plan of raising a considerable part, if not all, of his concentrates. Under such conditions the pasture will play a very important part, as it does in Europe,^b in farming operations. This can be done by better systems of handling stock, in order to prevent too early grazing and overstocking; also by fertilization, cultivation, reseeding, and the eradication of weeds.

As this deterioration has been going on for a long time the restoration can not be accomplished in one year. Based on results obtained in similar work elsewhere it is very probable that the improvement can ordinarily be accomplished in from three to five years with a comparatively small outlay of money.

^a Information relative to the reforestation of such areas can be secured by writing to the Forest Service, U. S. Department of Agriculture.

^b See Bulletin 140, Illinois Agricultural Experiment Station, 1909.

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THE PREVENTION OF OVERGRAZING.

A very essential point in the improvement of worn-out pastures is the prevention of overgrazing. If a pasture is to be improved it is absolutely necessary that the grass be given a chance to make a good healthy growth and that some of the plants be allowed to produce seed. This can be done by reducing the number of stock or by giving the cattle additional forage to supplement the pasture.

THE PREVENTION OF TOO EARLY PASTURING.

One of the most harmful practices in New York and the New England States is that of turning the cattle on pasture too early in the season. In a great many instances if the cattle were kept off for an additional week or ten days the pasture would produce far more feed during the entire season and would carry more stock. The grass should be given a sufficient start to allow enough green-leaf surface for the manufacture of the necessary substances utilized in its growth. If the grass is not given this chance its growth will of necessity be very slow and limited.

The turning of stock on a pasture while the ground is wet and inclined to be "punchy" is also a very bad practice, especially on a clay soil. The continuous trampling results in packing the soil so hard that it is difficult for the plant roots to penetrate between the soil particles and get the necessary plant food. This packing also prevents the absorption of air and water by the soil.

FERTILIZING.

Investigations carried on during the summer of 1909 show that one of the most essential points in pasture improvement is fertilizing. A close inspection of eastern pastures shows them to be lacking in humus. The best remedy for this trouble is barnyard manure. An excellent way of building up a pasture is to haul on the field whatever supplementary feed is given the cattle, placing it on the highest points. This method is used with great success in the corn belt, and also in many parts of the Southern States. If the distance from the pasture to the dairy barns or to the fields where the supplementary feed is grown is too great to make this method practicable, the land can be top-dressed with manure. Much better results will be obtained if a light top-dressing is used for three or four years in succession, or longer, than if a large quantity of manure is put on the land in one season. Experiments have proved definitely that relatively a much greater value is received from the manure when it is used often and in small quantities than when a large amount is used at one time.

On those areas where it is impossible to take a wagon, commercial fertilizers can be used to excellent advantage. Fertilizers containing principally phosphoric acid and potash would probably give the best results. It is also probable that a small quantity of such fertilizers could be used advantageously in connection with manure.

Lime should also be used, especially on the low pastures that are not well drained. However, it should not be applied at the same time as the manure or the commercial fertilizer. If manure or fertilizer is applied in the spring the lime would probably give better returns if put on the previous fall.

CULTIVATION.

Wherever a pasture is smooth enough and sufficiently free from stones to be plowed, the best plan will be to plow the land and grow cultivated crops on it for two or three years, or until the weeds have been killed. It can then be seeded down and if properly handled will soon become an excellent permanent pasture.

Under the average New England pasture conditions, plowing is not possible. The great majority of pastures in this region are on side-hills that are too steep for profitable cultivation or else are too full of rocks to permit economic farming. Cultivation in such cases will consist of using a disk, spring-tooth, or peg harrow, depending on which one is best adapted to individual conditions or easiest to obtain. The cultivation will consist of loosening the old sod and forming a sort of mulch to prevent too great evaporation and to cover whatever native seed there may chance to be. The harrow will also be of great value in pulverizing the droppings and distributing them more evenly, thus greatly increasing their value. In many instances cultivation can be practiced only in connection with reseeding or the use of fertilizers. Where reseeding is practiced and the land is too rocky for the use of farm implements the seed can be worked into the ground by the use of brush harrows.

RESEEDING.

In many instances reseeding will greatly quicken the process of restoration. If a farmer desires to reseed his pasture a mixture of timothy, red-top, bluegrass, and white clover will be the most practical one. The timothy will give the quickest returns, but will run out after three or four years. It will last long enough to give the other grasses, which require about three years, time to become established. This seed can be broadcasted by hand, or the method of a very successful New York farmer of always spreading a few ounces of seed over the top of his loaded manure spreader when top-dressing his meadows and pastures can be followed advantageously.

THE ERADICATION OF WEEDS.

Whenever a pasture is too rough to permit bringing it under cultivation, other methods of weed eradication will be necessary. A large percentage of the weeds can be destroyed if they are cut with a scythe just before they go to seed and, if possible, at their period of lowest vitality. Some of the more dangerous weeds that can not be killed in this manner will have to be dug out with a hoe or pulled by hand. The best cattle graziers in the Southern States find that if they go over their pastures once or twice a year and destroy the more dangerous weeds they have very little trouble from this cause.

SUMMARY.

(1) The pastures of eastern New York and the New England States have deteriorated greatly.

(2) In direct contrast, beef pastures in other parts of the country of the same age are in as good condition as originally.

(3) In the corn belt badly worn land is built up by using it as a pasture and feeding on it.

(4) Graziers of beef cattle have learned by experience that too early grazing is harmful.

(5) Graziers have also learned that close grazing does not pay.

(6) A study of their life history shows that plants must be allowed sufficient green-leaf surface to manufacture plant food. If this is not done the plants will produce very little feed and will die.

(7) Too close grazing gives opportunity for dangerous weeds to become established.

(8) The deterioration of pastures in New York and New England is mostly due to close grazing, because (1) this prevents perennial plants storing the food necessary for starting in spring; (2) it results in a heavy loss of humus; (3) it makes the ground too dry for the maintenance of native forage plants; and (4) it causes a considerable loss of plant food from the soil.

(9) These conditions can be remedied by (1) the prevention of overgrazing; (2) the prevention of too early grazing; (3) fertilizing; (4) cultivating; (5) reseeding; and (6) the eradication of weeds.

Approved:

JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., *January 8, 1910.*

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